DOT Revised 8/85 QX A-219

Washington State Department of Transportation

DEVELOPMENT PLANNING

INTRA-DEPARTMENTAL COMMUNICATION

DATE: September 27, 1988

FROM: S. A. Moon
PHONE:

SUBJECT: SR 546
Route Development Plan
MP 0.00 to MP 8.02

TO: J. F. Conrad
District 1, MS 122

The long-range route development plan, as submitted by your IDC of March 24, 1988 and revised by your IDC September 9, 1988, is approved with the following comment:

1. Applicable environmental documents will be required for all WSDOT projects used in implementing this plan.

Attached for your use is a xerox print and a reproducible of the roadway section approved for this route development plan.

SAM:pac/F357
STC (DR)

Attachment

cc: J. L. Lutz, Dist 1, MS 113
J. Lenzi, PR&PT

SR 546

ROUTE DEVELOPMENT PLAN
MILEPOST 0.00 TO 8.02

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
DISTRICT NO. 1
SEATTLE, WASHINGTON

R. E. BOCKSTRUCK, PE
DISTRICT ADMINISTRATOR

J. F. CONRAD, PE
PLANNING & OPERATIONS ENGINEER

APPROVED SEPT. 27, 1988

TABLE OF CONTENTS

EXECUTIVE SUMMARY

SR 546 is located in northern Whatcom County a couple of miles south of the border which it parallels. It is about eight miles long and connects SR 539 and SR 9. Lynden is the nearest incorporated city. The route has become more important with the large increase of traffic on SR 539 (the Guide Meridian) and trade with Canada. This route was selected for study at this time because of its relationship with SR 539.

Currently SR 546 functions as a collector and arterial. Development is light and predominantly agricultural in use with scattered residential and commercial uses at a few intersections. While no significant intensification of use is foreseen along the road an increase in traffic will likely result. This growth is forecast at a 2.2% annual rate. The 2.2% route development plan is targeted for year 2010. However no significant increase in capacity is needed to accommodate the predicted traffic growth.

The route development plan deals with the entire length of SR 546 (MP 0.00 to 8.02). The plan recommends some channelization at several intersections. Eventually when warrants are met, signals will be needed at the junctions with SR 539 and SR 9. Two lanes should be sufficient to handle future volumes so no increase is proposed. Extensive work on bridges and culverts, scheduled for the near future, will upgrade the route.

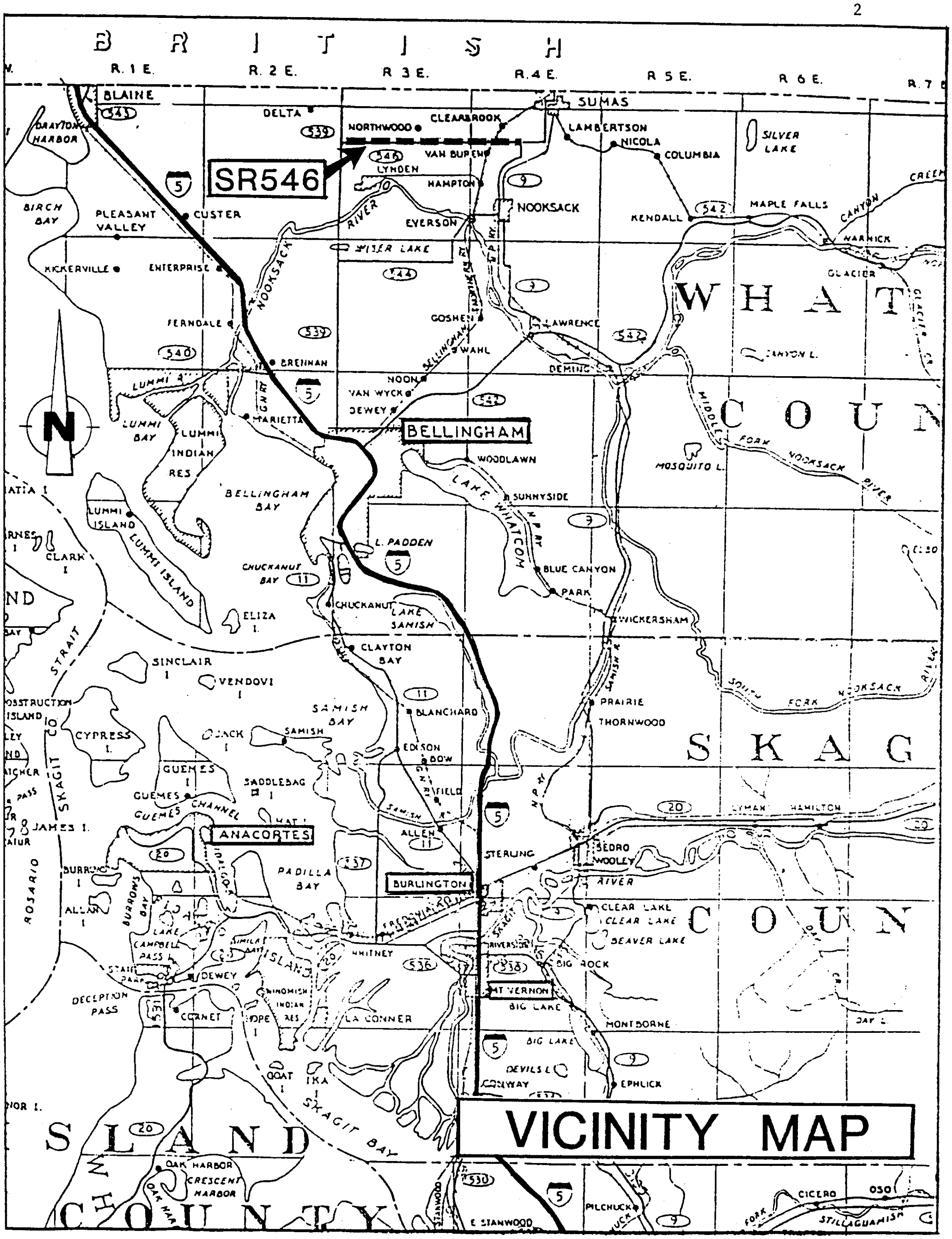
ROUTE DEVELOPMENT PLAN

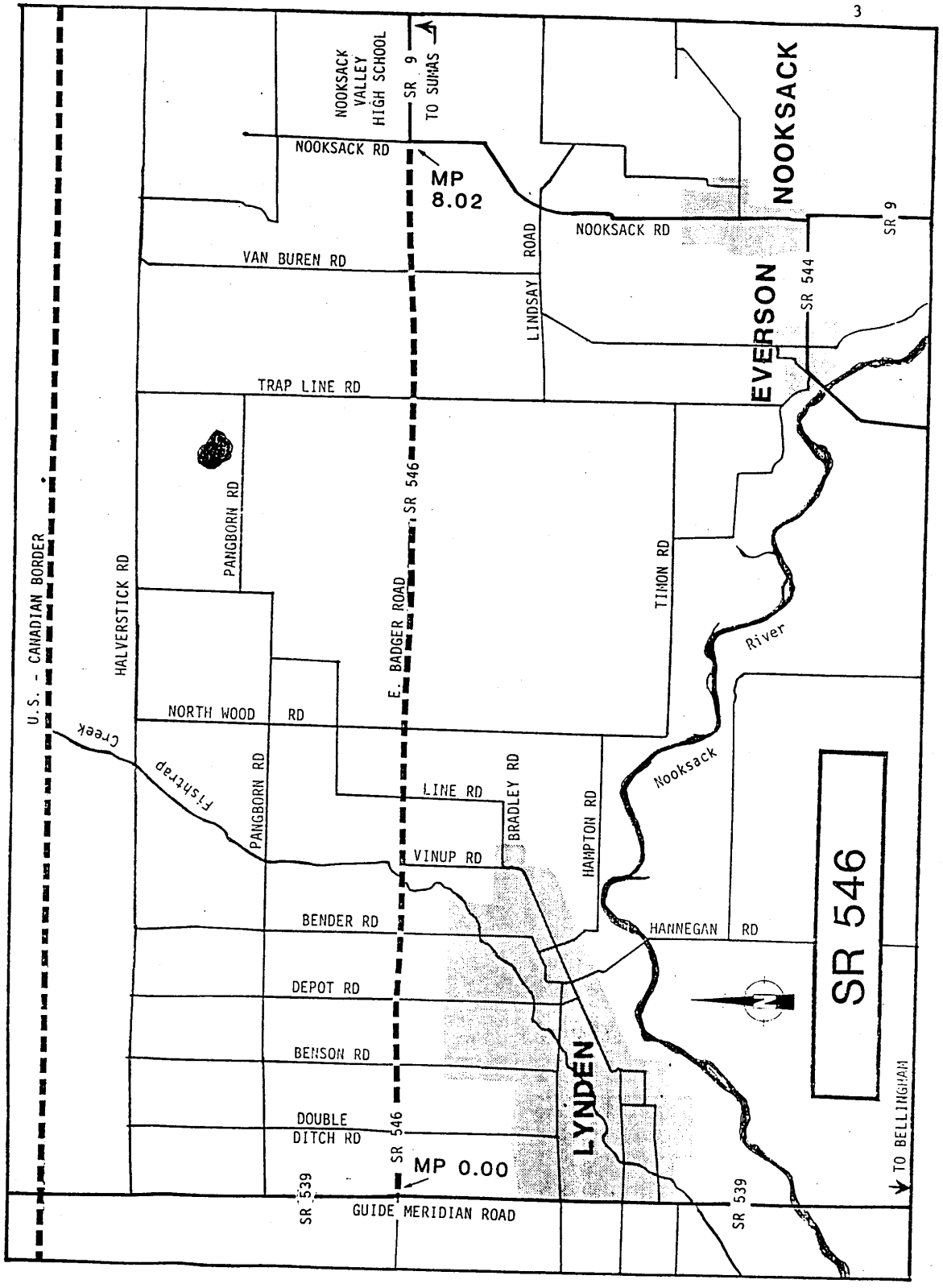
Introduction

A Route Development Plan is intended to identify the improvements needed for a designated section of state highway to attain a desired level of service at a future date usually 20 years hence. Such a plan encompasses a myriad of factors distilled into a recommended highway design. When approved this long range plan will provide guidance for development of the District's program of projects as well as guiding the District's Developer Group in defining developer impact mitigation measurers.

Background

This study of SR 546 is part of the Washington State Department of Transportation (WSDOT) District 1 long range route development planning program. SR 546 is classified as a Minor Arterial on the 1986 Functional Classification Plan. The highway is 8.02 miles long and runs parallel to and 2.6 miles south of the Canadian border between


BRITISH
R. 1 E.
R. 2 E.
R 3 E.
R. 4 E.
R 5 E.
R 6 E.
SR546
BLAINE
SUMAS
DELTA
NORTHWOOD
CLEARBROOK
LAMBERTSON
NICOLA
COLUMBIA
VAN BUREN
LYNDEN
HAMPTON
NOOKSACK
EVERSON
KENDALL
MAPLE FALLS
CUSTER
PLEASANT VALLEY
ENTERPRISE
FERNDALE
GOSHEN
LAWRENCE
WAHL
BRENNAN
DEMING
NOON
VAN WYCK
DEWEY
MARIETTA
BELLINGHAM
WOODLAWN
SUNNYSIDE
BELLINGHAM BAY
LAKE WHATCOM
L. PADDEN
BLUE CANYON
PARK
CHUCKANUT
LAKE SAMISH
WICKERSHAM
CLAYTON BAY
SINCLAIR
VENDOVI
SAMISH BAY
BLANCHARD
PRAIRIE
THORNWOOD
CYPRESS
EDISON
BOW
GUEMES
SADDLEBAG
ANACORTES
ALLEN
STERLING
SEDRO WOOLLEY
LYMAN
HAMILTON
PADILLA BAY
BURLINGTON
CLEAR LAKE
BEAVER LAKE
WHITNEY
BIG ROCK
MT VERNON
DEWEY
DECEPTION PASS
LA CONNER
MONTBORNE
BIG LAKE
DEVILS L.
CONWAY
EPHLICK
SKAGIT BAY
VICINITY MAP
OAK HARBOR
CRESCENT HARBOR
E STANWOOD
PILCHUCK
CICERO
OSO
WHATCOM COUNTY
SKAGIT COUNTY
ISLAND COUNTY
N


NOOKSACK VALLEY HIGH SCHOOL
SR 9
TO SUMAS
NOOKSACK RD
MP 8.02
NOOKSACK
NOOKSACK RD
SR 9
VAN BUREN RD
LINDSAY ROAD
SR 544
EVERSON
TRAP LINE RD
PANGBORN RD
SR 546
E. BADGER ROAD
TIMON RD
HALVERSTICK RD
U.S. - CANADIAN BORDER
River
NORTH WOOD RD
Creek
Fishtrap
PANGBORN RD
LINE RD
BRADLEY RD
HAMPTON RD
Nooksack
VINUP RD
BENDER RD
HANNEGAN RD
SR 546
DEPOT RD
BENSON RD
LYNDEN
DOUBLE DITCH RD
SR 546
MP 0.00
SR 539
GUIDE MERIDIAN ROAD
SR 539
TO BELLINGHAM

SR 539 and SR 9. Lynden is the nearest city being about 0.6 miles south of SR 546. The 1986 Level of Development Plan indicates "Maintain Structural Integrity" as the standard to which future improvements and maintenance of the highway will be accomplished.

The predominant zoning classification adjacent to SR 546 is AG (Agricultural). At the intersections of SR 546 with North Wood and Trap Line Roads there are two nodes of more intensive zoning. At North Wood Road there is a mixture of low density residential zones (1 dwelling unit for 2 and 5 acres) on three corners and the fourth corner is a small commercial parcel. On three corners at Trap Line Road the land is zoned S-5A (one dwelling unit for 5 acres) and the fourth corner contains a small commercial parcel. The Whatcom County Comprehensive Plan for this sub area indicates agricultural use along most of the highway corridor with rural residential zoning about the two intersections mentioned above. The target year of the Comprehensive Plan is 2000. A primary policy statement of the Plan is the desire "to protect and encourage agricultural use of the land" in this area. The present zoning reinforces the planned pattern of future development envisioned by the County for this area.

TYPICAL ROADWAY SECTION

The proposed roadway characteristics correspond for the most part to that of a Minor Arterial Design class M-2.

Number of Lanes Based

The 1985 Traffic Report estimated daily volumes of 3100 (ADT) on SR 546 West of the SR 9 Junction. Actual counts taken two years later (week of May 17, 1987) revealed totals of 3340 and 3700 at the same location. Maximum peak hour counts for those days were 280 and 290 vehicles. However counts for the week of June 9, 1987, indicated ADTs of 5600 - 6300 on SR 546 near Depot Road. Peak hour volumes were near 400 vehicles. For estimating purposes, a design hour volume of 400 was assumed as the present base figure. This number was projected to the year 2010 at a 2.2% annual growth rate resulting in a design hour volume (DHV) of approximately 650 vehicles. The present level of service (LOS) for SR 546 is "B." With the modest increase projected for the next 22 years the level of service would drop to LOS "C." The State Level of Development Plan calls for maximum DHV of 700 for minor materials of two lanes. Since the DHV is less than the 700 vehicle level, two lanes should be adequate to carry projected volumes in the future.

Right of Way Width

A minimum right of way of 80 feet is proposed with 100 feet at intersections requiring channelization. This amount of right of way is sufficient to accommodate the open drainage ditches that prevail along the highway and to locate utility poles further away from the road edge. Presently the right of way is 60 feet wide except for a short 100 foot wide section east of Benson Road. While the design standard for M-4 calls for 100 feet of right of way that amount is not needed in all instances for a road such as SR 546 since the region it serves is very lightly populated. Additionally, the highway does not serve a commuter function, is not a significant traffic generator and is not a route heavily oriented toward the tourist trade. However, because of a high percentage (20%) of large trucks making right turns from SR 546, several intersections should be improved with right turn channelization. Such intersections will require 100 feet of right of way. The only left turn channelization that is likely to be warranted in the immediate future is at the junctions of SR 546 with SR 539 and SR 9.

Lane and Shoulder Width

The proposed roadway would measure thirty two (32) feet in width and be composed of two 12 foot wide lanes and two 4 foot wide shoulders. These roadway dimensions are in accordance with accepted WSDOT standards for minor arterials of the M-4 design class.

Curb, Gutter and Sidewalk

These facilities are not needed along SR 546. The route does not pass through any urbanized area and only two intersections have abutting development. The Comprehensive Plan for this area indicates that no increases in density should occur during the planning period. Thus, as a rural highway, no curbs, gutters or sidewalks are proposed.

LEVEL OF ACCESS CONTROL

SR 546 is not designated for access control according to the 1979 Implementation Plan. Moreover, access will be minimal due to the present and future zoning pattern. For much of the route the residential density is only one dwelling unit for five acres. Translated into frontage along the highway, this could mean about one or two driveways for every 400 feet.

While it is desirable to minimize access points along arterial highways, no formalized access control measures will be necessary since the low density zoning requirements should accomplish this for SR 546.

INTERCHANGES

No interchanges are needed or planned. Because SR 546 is only a minor arterial that carries light traffic volumes and is designated as a non-access controlled highway, interchanges are neither merited nor proposed.

INTERSECTIONS

Conceptual Channelization Plan

The intersections at either end of SR 546 will require full channelization because of accident experience and congestion. Other intersections will not likely require left turn channelization due to their relatively small traffic volumes and limited turning movements. The possible exceptions might be the intersections at Depot and Bender Roads where access to Lynden could generate enough turning movements to justify left turn pockets in the future. However, because of the high percentage of trucks and their travel patterns, all existing intersections between SR 539 and SR 9 are proposed for right turn channelization in the near future (see Design Report L-8308 "Resurfacing and Bridge Widening" - approved 12-4-87).

The following table indicates where future channelization is either proposed for construction or would be appropriate if volumes continue to increase:

LOCATION	MP	RIGHT TURN	LEFT TURN
SR 539	0.00	WB to NB	WB to SB
Double Ditch	0.50	EB to SB, WB to NB	none
Benson Rd.	1.00	EB to SB, WB to NB	none
Depot Rd.	1.50	EB to SB, WB to NB	WB to SB
Bender Rd.	2.01	EB to SB, WB to NB	WB to SB
Vinup Rd.	2.53	EB to SB	none
Line Rd.	3.04	EB to SB, WB to NB	none
Northwood Rd.	3.55	EB to SB, WB to NB	none
Trapline Rd.	6.05	EB to SB, WB to NB	none
Van Buren Rd.	7.00	EB to SB, WB to NB	none
SR 9	9.02	EB to SB	EB to NB

NOTE: All right turn channelization is scheduled for construction by 1990 except for the SR 9 intersection.

Signalization

Three intersection locations on SR 546 appear on the signal priority listing. The intersection of SR 546 and SR 539 is ranked 108th, primarily because of volumes. The intersection of SR 546 and SR 9 ranked 233rd on the signal prioritization list. It did not meet either volume or accident warrants. The intersection of SR 5
6 and Depot Road ranked 170th on the list, but did not meet MUTCD warrants for volume, interruption or accidents. These are the only three locations where signals might possibly to be installed during the planning period.

ROADWAY CHARACTERISTICS

Design Speed

The design speed is set at 55 MPH. The posted speed limit along the highway is also 55 MPH.

Accident History

There were 80 accidents on SR 546 for the years 1983 through 1986 and four fatalities. Sixty-eight (68) people were injured on this eight mile stretch of highway. The segment of roadway containing the intersection of SR 546 and SR 539 had the highest accident rate along the corridor - 4.4 accidents per million vehicle miles traveled. The accident rate for the entire route averaged 2.1 for the study period (1983-86). For each of the three years evaluated, the accident rate on SR 546 exceeded the statewide figure. The highest rate for the route during this period was in 1984 when it reached 2.7 as compared to the state rate of 1.8. During that same year three (3) fatalities occurred as well. The fatality rate (deaths per hundred million vehicle miles traveled) soared to 31.6 in 1984 as compared to the State Fatality rate of 2.0. Fatalities were the result of three separate accidents, which included a head on collision, another collision involving a vehicle entering from a side street, and the third being a pedestrian struck during a snowy period. None of the fatal accidents appeared to be related to the character of the road. All the accidents were spread rather uniformly over the entire route's length except for the most easterly one mile section, which had about one half as many accidents as sections of similar length further to the west. This is surprising considering the fact that a high school is located adjacent to the highway in this most easterly sector of SR 546.

The most frequent type of accidents involved only one car; hitting a road side object (21 times) turning upside down (5) or running into the ditch (6). All totaled there were 34 (42%) accidents that did not involve another vehicle. Left turning

vehicles accounted for only 16% of the accident total. The reasons for so many one car accidents are unknown but the narrow shoulders (three feet for half of the length of the road), numerous bridges and deep roadside ditches may be important factors. Bringing shoulder widths up to a wider standard should address this issue along with the bridge improvements currently planned for construction.

The District has adopted a list of safety priorities. They are in order of importance:

1. Removal of hard objects.
2. Protection of motorists from hard objects by installing safety features.
3. Provision of barriers to shield steep slopes, waterways, depressed areas, etc.
4. Removal or replacement of obsolete roadside features with guardrail and/or concrete barriers of current design standards.

These safety features are incorporated into the improvement program indicated in the 1986 priority array.

Sight-Distance Restriction

The speed limit is 55 MPH. There are five sections along the road that are posted "NO PASSING." Such restricted zones constitute 15% of the total route length with most of the restricted area being in the eastern half. All horizontal alignments are within acceptable guidelines. Three locations contain vertical curves that have available sight distances below the current guidelines. These are:

LOCATION	VERTICAL CURVE	STOPPING SIGHT-DISTANCE
MP 3.24	Crest	400
MP 6.30	Crest	325
MP 6.52	Crest	275

Where vehicles enter the highway in close proximity to a bridge, the available sight distance can be impaired by the bridge rail structure. Replacement of bridges with culverts will improve such a condition.

HIGH OCCUPANCY VEHICLE TREATMENT

The lack of substantial traffic volumes and congestion makes any HOV treatment on SR 546 of little value now or in the foreseeable future. Therefore no HOV treatment is proposed at this time.

BRIDGES AND STRUCTURES

There are ten structures on SR 546. All of them cross over water courses, which are generally open ditches (see appendix "A" for list and specifications of bridges). Structure spans vary between 10 and 60 feet in length and are all wider than 20 feet. Nearly all the bridges are being replaced or rebuilt during 1989 with three bridges being widened and six being replaced with culverts. The Whatcom County Engineer believes that the existing structures are a hazard because of their narrowness. A review of the accident data revealed one accident where a vehicle struck the bridge. Two others may have been related to a bridge but no collision with any bridge structure was noted. Nevertheless, planned improvements wherein six bridges are to be replaced by culverts will make this route a much safer roadway environment.

MISCELLANEOUS

Pedestrian Facilities

No designated paths or trails are proposed along this route. There are no points of interest and few potential users to justify such facilities.

Bike Path/Lanes

This road is an element of the statewide Bicycle Corridor Master plan. The proposed four (4) foot shoulders will be sufficiently wide for safe bicycle use. Nooksack Valley High School is the only significant generator along the corridor and should receive special attention in any plans that would improve a bicycle path along SR 546.

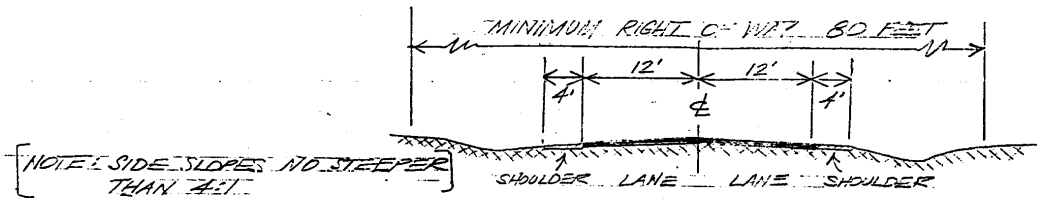
Bus Pullouts

No bus pullouts are planned for this route. Insufficient densities exist to support any public transit along SR 546 in the future. Presently no transit service has been authorized by Whatcom County for this area. The nearest point that the Whatcom Transit Authority is authorized to serve is at Kellogg Avenue on the Guide Meridian (SR 539), a distance of more than 11 miles to the south.

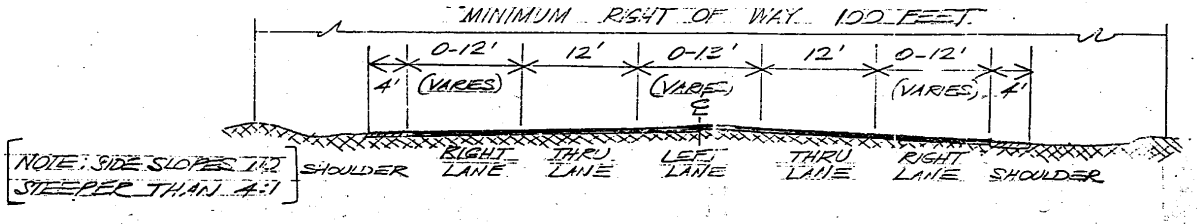
Land Developer Participation

Any person developing land adjacent to a state highway is expected to mitigate any adverse impacts that they would impose on that highway. Along SR 546 little impact from development will occur if the present zoning and comprehensive plan are adhered to. Donation of ten feet of right of way (80 feet total R/W width) should be adequate mitigation for roadway impacts at nonintersection locations. However additional right of way will be needed at certain intersections to provide adequate area for future channelization.

TYPICAL ROADWAY SECTION



CHANNELIZED SECTION



NOTE: Where "New" is superimposed over "Existing" delineate relationship.

GEOMETRIC DESIGN DATA		
Functional Class of Highway	MINOR ARTERIAL	
Level of Development Plan	M.S.L.	
Terrain	LEVEL	
Design Speed (V)	55	
A.D.T. 19 88	420	
A.D.T. 20 10	650	
K%		
Directional % (D)		
Truck (Dual Tires) % of DHV (T)		

BRIDGE DATA

EXISTING BRIDGES

Bridge No.	Approx. Sta.	Pavt. Seat to Pavt. Seat	Clear Rdwy. Width

PROPOSED BRIDGES

Name of Crossing	Approx. Sta.

DATE	REVISION	BY	APPROVED

APPROVED BY:

☒ STATE LOCATION-DESIGN ENGINEER ☐ DISTRICT ADMINISTRATOR

☐ DISTRICT PROJECT DEVELOPMENT ENGINEER

9-23-88 DATE

J.A. Moon SIGNATURE

ROADWAY SECTION

BR. NO. 546

ROUTE DEVELOPMENT PLAN (PROJECT TITLE)

LOCATION NO. _____ PROJECT NO. _____

DATE 9/1/88 DISTRICT NO. 1

SHEET 1 OF 1 SHEETS

11